

**DECLARATION OF ADAM GOLDBERG**

1. I have been retained by Defendants Sony Electronics, Inc., and ABC Warehouse, Inc. (collectively, “Sony”) and their counsel, Miller Canfield, LLP, to serve as a technical consultant in this case.

2. I have personal knowledge of the facts discussed herein and, if called to testify, I would and could competently testify to those facts.

3. I have been involved in digital television engineering for nearly 19 years. I am a private consultant and principal of AGP, LLC, a firm specializing in engineering consultation on audio/video silicon products, real-time operating system programming and development, set-top box development, audio/video compression systems development and architecture, the electronic intricacies of television broadcasting, and internet technologies. Additionally, I have extensive experience participating in multi-industry forums, chairing and participating in technical standards committees, including those for the consumer electronics and television broadcasting industries, and policy and strategy-forming groups, including international groups—all relating to the aforementioned technologies.

4. I have been an active participant in ATSC standards activities since 1997, and Consumer Electronics Association (CEA) standards activities since 1998. During that time I have been an active participant in Advanced Televisions Systems Committee (ATSC) subgroup T3/S8 and am currently the chairman of CEA R4.3 and ATSC TSG/S7. I have previously been elected the vice-chair of the CEA Technology and Standards Committee, and in 2007 was elected to the Board of Directors of the ATSC.

5. I have a B.S. in Computer Science and am the named inventor on one patent.

## **I. Television Standards and Standards-Making Bodies**

6. Digital television, end-to-end, is a very complex system. Interoperability standards are necessary for content to transfer from original film or video cameras through editing, post-production, transfer to networks, television stations, satellite operators, cable operators, and television networks.

7. Broadly speaking, there are three main standards organizations which make interoperability standards for digital television in the United States: the Society of Motion Picture and Television Engineers (“SMPTE”), the Advanced Television Systems Committee (“ATSC”) and the Consumer Electronics Association (“CEA”). I have been involved in standards-making for each of these organizations.

8. The Society of Motion Picture and Television Engineers, is the leading technical society for the motion imaging industry. SMPTE is mainly focused on standards for professional interfaces, cameras, tape formats, and inter- and intra-facility connections. SMPTE publishes ANSI-approved Standards, Recommended Practices, and Engineering Guidelines, along with the highly regarded SMPTE Journal and its peer-reviewed technical papers. SMPTE standards are widely used in television stations, television networks and production facilities.

9. The Advanced Television Systems Committee, Inc., (“ATSC”) is an international, non-profit organization developing voluntary standards for digital television. ATSC member organizations represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

10. ATSC was formed in 1982 by the member organizations of the Joint Committee on InterSociety Coordination (JCIC): the Electronic Industries Association (EIA), the Institute of Electrical and Electronic Engineers (IEEE), the National Association of Broadcasters (NAB), the

National Cable Telecommunications Association (NCTA), and the Society of Motion Picture and Television Engineers (SMPTE). ATSC members represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

11. ATSC coordinates television standards among different communications media focusing on digital television, and is mainly focused on standards which specify the broadcast of digital television. These standards include the method for modulating digital data over-the-air, as well as standards for how the data is organized, in what formats audio and video are compressed and what audio and video formats are allowed.

12. CEA is both a trade association for the consumer electronics industry and a standards defining organization. CEA standards are mainly focused on interfaces and some internal aspects of consumer electronics devices like televisions. Occasionally, CEA (as a trade association) creates trademarks and licensing regimes to limit use of the marks to devices which comply with specific requirements. For example, CEA has a trademark and licensing regime around a “HDTV” mark, and only televisions that meet specific requirements may bear the HDTV mark.<sup>1</sup>

## **II. The Advanced Television Systems Committee (“ATSC”)**

13. The ATSC is a non-profit membership corporation which was established as a part of the definition of a digital successor to the analog television standard (known as “NTSC”). The ATSC has a president, chairman and board of directors, and several committees and subcommittees. With the exception of a small staff, all the participants, including myself, are

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<sup>1</sup> The requirements for the HDTV mark are unrelated to the issues before us in this matter, though the televisions at issue do seem to meet the requirements for the mark; for a television receiver to bear the HDTV mark, it must receive digital terrestrial transmissions, decode all of the ATSC-defined formats, and have a display with active vertical scanning lines of 720p, 1080i or higher. See Consumer Electronics Ass’n, *DTV Product Marks*, at <http://www.ce.org/Standards/3110.asp> (last visited Jan. 29, 2011).

contributing their technical expertise to advance the ATSC's aim – to develop a comprehensive standard for digital television.

14. The ATSC is a standards-defining organization which operates under a set of policies and procedures for initiation, development and approval of technical standards for digital television broadcasts.

15. The ATSC standard A/53 defines a set of video formats for broadcast which includes “720p” (720 x 1280 at 23.976, 24, 29.97, 30, 59.94 and 60 progressive frames per second), “1080i” (1080 x 1920 at 59.94 and 60 interlaced fields per second) and “1080p” (1080 x 1920 at 23.976, 24, 29.97 and 30 progressive frames per second). These formats were originally described in Table 3 of an earlier version of ATSC A/53, and are therefore referred to as “Table 3 formats” – however, due to an editorial reorganization of the standard, it is now described in Table 6.2 of ATSC A/53, Part 4. *See* Advanced Television Systems Committee, *ATSC Digital Television Standard: Part 4 – MPEG-2 Video System Characteristics* (Aug. 7, 2009) at 9.

16. Television broadcasts that comply with ATSC standards may emit video at 720p, 1080i, 1080p and several other lower-resolution formats. However, the ATSC is not a regulatory body and does not make regulations upon television broadcasters.

17. ATSC does not define standards for professional interfaces, *e.g.*, at television stations and therefore does not compete with SMPTE.

18. ATSC does not define standards for consumer electronics devices like televisions. In fact, ATSC standards development goes to great pains to avoid making requirements on receivers and consumer electronics devices.

19. In particular, ATSC does not have a definition or requirements for what a “1080p” television is.

20. Additionally, ATSC has no standards whatsoever that relate directly to HDMI. HDMI is an interface standard between consumer electronics devices, which is out of the scope of ATSC; ATSC is focused entirely on over-the-air broadcast standards.

21. Some of the standards that were created by the ATSC have been adopted by the Federal Communications Commission (“FCC”) as the standard for digital television broadcasting in the United States. 47 C.F.R. 73.682(d). None of the standards referred to by the FCC make any requirement as to 1080p.

### **III. Definition of a Television**

22. It is my understanding that the Plaintiffs claim that the products at issue were labeled and advertised as “1080p televisions” and similar, and that the Plaintiffs claim that this is technically incorrect in that the televisions may only receive 1080p signals via an antenna interface.

23. It is my observation that a television is a device with a particular sort of radio frequency tuner such that it may receive television broadcasts received via an antenna, and subsequently display the audio and video contained therein via speakers and on a video screen.

24. Furthermore, the FCC makes certain specific requirements of televisions. These include closed captioning display capability, program blocking capability and others. *See* 47 C.F.R. 15.117.

25. Some FCC requirements include labeling requirements upon devices labeled as “digital cable ready”, which is unrelated to 1080p. *See* 47 C.F.R. 15.123. But the FCC makes no specific requirements on display resolutions, display formats, or similar aspects of television.

26. The FCC does require that “TV broadcast receivers are required only to provide useable picture and sound commensurate with their video and audio capabilities when receiving digital television signals.” 47 C.F.R. 15.117(h).

27. Therefore, I conclude that the televisions at issue are 1080p televisions because they are television broadcast receivers, and will display such a signal on a 1080p resolution display.

#### **IV. These Televisions are 1080p Televisions**

28. During the course of my investigation for this declaration, I have reviewed the technical specifications of the televisions at issue.

29. The televisions at issue have the capability to receive television broadcast signals and display them in a usable format, and are therefore “televisions”.

30. The televisions each have a 1920x1080 resolution, progressive display component.

31. Therefore, it is my opinion after reviewing the technical specifications for the televisions, that the televisions in question are, in fact, “1080p televisions”. I explicitly disagree with any assertion that they are not “1080p televisions”.

#### **V. Typical Television Broadcast Signals**

32. High definition digital television broadcasts, both over-the-air and otherwise are encoded using either 720p or 1080i. Some television networks use 720p exclusively, others use 1080i exclusively.

33. In my experience and understanding as an expert in this field, any linear broadcast television programming experienced by a consumer in the United States is encoded using either 720p or 1080i or a lower resolution (*e.g.*, 704 x 480, “480i”, the analog television resolution).

34. It is also my experience and understanding as an expert in the field that a fixed pixel or fixed resolution display can only display the video resolution of its display. The devices at issue all have 1080p native resolution displays.

35. Any display with a fixed resolution display converts input signal formats (*e.g.*, 720p and 1080i) to the device's native display resolution.

36. Therefore, no matter the input signal resolution (*e.g.*, 720p or 1080i) the video shown on the television has been up-converted to 1080p.

## **VI. 1080p Video Is Broadcast**

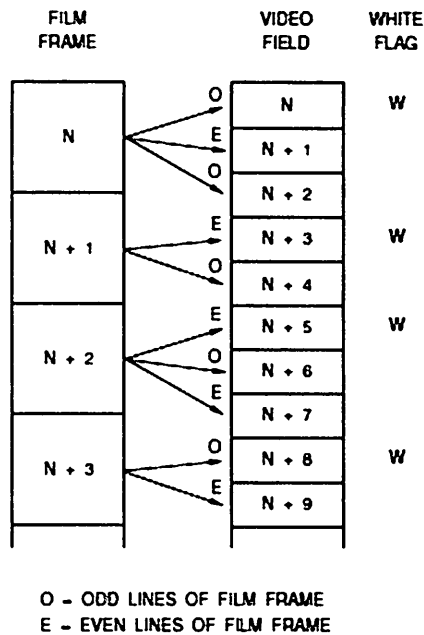
37. Movies and most prime-time television is captured on film originally (not video), and when such programming is broadcast in 1080i, it is in fact encoded, decoded and displayed as 1080p. In short, 1080p effectively *is* broadcast in over-the-air television.

38. All motion picture productions (movies), most prime-time television programming and most television advertising is originally captured on film, using either a 16mm or 35mm film camera. JERRY WHITAKER, DTV: THE REVOLUTION IN DIGITAL VIDEO (McGraw-Hill, 3<sup>rd</sup> ed. 2001) at 68.

39. 16mm and 35mm film operates at 24 frames per second. Thus, all motion pictures and most prime-time television programming is originated on progressive (non-interlaced) film at 24 frames per second ("p24").

40. Because analog television is a 60 fields per second ("i60") format, format conversion between p24 and i60 is standard practice, and is called "telecine" (from 'television' and 'cinema'). This is generally done by using one of the p24 frames to create several of the i60 fields, as shown below.





(source: KEITH JACK, VIDEO DEMYSTIFIED: A HANDBOOK FOR THE DIGITAL ENGINEER (3<sup>rd</sup> ed. 2001) at 227.)

41. The telecine process creates an i60 sequence of fields, which were used to broadcast p24 content using the analog television system, which was 60 fields per second, interlaced. An identical process is used for broadcasting p24 content using i60 formats like 1080i.

42. Digital television is compressed using the MPEG-2 standard for broadcast. Television receivers include MPEG-2 decompression capabilities.

43. MPEG-2, like all compression systems, is designed to minimize the amount of information included in the compressed output, and it is a fundamental aspect of MPEG-2 to avoid duplicate information in the compressed output when possible. In telecined content, each p24 frame is the source for two or three i60 fields. When a p24 frame is the source of three i60 fields, the first and third fields consist of identical information (a repeated field).



44. When MPEG-2 was created, its authors were perfectly aware of the telecine process and designed capabilities into the MPEG-2 system to avoid any need to carry duplicated fields in an interlaced signal.

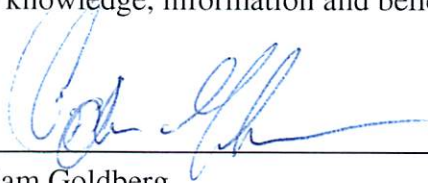
45. Therefore, MPEG-2 includes mechanisms to indicate which fields are repeated in order to minimize duplicated information in compressed output streams.

46. Furthermore, MPEG-2 equipment in use in the broadcast industry uses technology to perform “telecine detection”, and when its input is found to be telecined content, performs a process known as “inverse telecine”, whereby the telecine process is reversed, yielding p24 video.

47. Therefore, when movies and most prime-time television is broadcast in 1080i, it is in fact encoded, decoded and displayed as 1080p. For p24 content – movies and most prime-time programming – it doesn’t matter whether a broadcaster chooses to use 1080i or 1080p, the MPEG-2 compression/decompression cycle will yield p24 video for display.

I declare under penalty of perjury under the laws of the United States that the foregoing information is true and correct to the best of my knowledge, information and belief.

Dated: February 12, 2011

  
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Adam Goldberg